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PERFORMANCE OF THE AIRBORNE ULTRA HIGH SENSITIVITY AEROSOL SPECTROMETER DURING THE CARBONACEOUS AEROSOL AND RADIATIVE EFFECTS STUDY AND CALWATER FIELD CAMPAIGNS

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ABSTRACT

Anthropogenic aerosols effect on the formation of clouds and precipitation amounts is one of the largest uncertainties in the prediction of global climate change. To determine the magnitude of this effect, the Airborne Ultra High Sensitivity Aerosol Spectrometer (UHSAS) is being used to measure aerosol size distributions from 0.060 to 1.0 mm at a frequency of 1HZ. This high temporal resolution enables detailed analysis of urban pollution plumes and the aerosol in the proximity of clouds. The instrument was recently operated aboard the Department of Energy (DOE) Atmospheric Radiation Measurement (ARM) Aerial Facility Gulfstream-1 aircraft during the Carbonaceous Aerosol and Radiative Effects Study in June 2010 and the CalWater field campaign in February 2011. The measured size distributions will be compared with the measured size distributions from other instruments operated aboard the aircraft to determine the overall performance of the instrument within different environmental conditions and when sampling different mixtures of aerosol composition. In addition, a preliminary analysis of the aerosol and the aerosol effect on clouds over the California Central Valley and the Sierra Nevada mountain range during the summer season, winter season, atmospheric river events, and long-range transport events from Asia will be presented.